ADHD:

Methodology of Treatment in Hyperactive/Impulsive, Inattentive, and Combined Type

A Senior Thesis

By

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Group: Psychology I

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Abstract

Attention Deficit Disorder (ADD/ADHD) is a highly heritable behavioral disorder. Frequently, a child with ADD/ADHD is labeled as a problem child instead of a child with a problem. Furthermore, there are three subtypes of ADHD. The nuances of each of the subtypes require different considerations when devising a plan of action to assist these children in functioning in the classroom, among their peers, and in the world. Inattentive (I) children's social skills are relatively age appropriate; however, their classroom skills and ability to succeed in performing tasks is diminished relative to same-aged peers. Hyperactive/Impulsive (HI) children perform better than other ADHD students in classroom skills, but their social skills (e.g., ability to interact with both peers and others) are diminished. Combined Type (CT) children manifest qualities of both I and HI children (e.g., problems with classroom skills and social skills).

Through survey mailouts, information regarding parental perceptions of effectiveness of various treatments was obtained. The treatments examined were medications, school programs, and communications between teachers and parents, physicians and parents, and teachers and physicians. This information was then compiled and analyzed. In all cases the quality of communication was reported as a more important factor than frequency of communication in regard to level of usefulness.

Parents repeatedly emphasized the importance of educated awareness of ADHD and its treatment options as qualities teachers lack. Parents wanted teachers to be required to study learning and social disorders and to be trained in how to help children with these special needs. Another major factor affecting children in this study is limited progress due to the lack of cooperation of schools to provide support for ADHD children because they do not believe ADHD qualifies under The Rehabilitation Act of 1973 section 504 (which in 1991 was clarified by the U.S. Department of Education to include children with ADD) without co-morbid complications. Children with ADD are also protected by part B of the Individuals with Disabilities Education Act (IDEA). Both section 504 and IDEA are designed to ensure equal educational opportunities for all levels of learners.

Acknowledgments

There are many people that made this project possible. I'd like to thank Betty Milburn and Robert Heffer, my advisors, who put a lot of hard work and effort into preparing me to tackle the IRB, mail out my surveys, and wade through my data and into putting up with each new scheme of mine as I came up with it. There was a point in this process where my project nearly nose-dived and Rob and Betty are the ones that helped pull me through it.

Without the cooperation of fifty CH.A.D.D. coordinators across the country, I would have never had as diverse of a sample as I did. They took their precious time (most of them are parents with ADHD kids and/or ADHD themselves) to pass out my surveys.

I'd also like to thank the Undergraduate Fellows program for the chance to conduct my own research. It has been an enlightening opportunity and a great learning experience.

Last, but certainly not least, I'd like to thank the two people who have to put up with me the most: my roommate Kate Barron and my fiancé Celestino Garza. Kate has looked the other way for months as piles of paper grew on the table and our cat saw fit to rearrange them. Celestino has tried to explain endless computer and software problems I've had and to help me overcome them. Thank you both for your patience.

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Literature Review

Attention Deficit Disorder (ADD), sometimes referred to as Attention Deficit Hyperactivity Disorder (ADHD), is classified as three basic subtypes: Hyperactive Impulsive (HI), Inattentive (I), and Combined Type (CT). Each subtype has several basic associated characteristics. Children (on whom this study focuses) with type HI are restless, overactive, easily distracted, impulsive decision makers, and have trouble associating socially with peers and others. This subtype is more easily identified than type I due to the hyperactive nature of the children's behavior. Children with type I have very short attention spans (ability to focus on a lecture lags behind their age group by 2-5 years) and a reduced ability to remain focused on tasks (e.g., daydreaming). As a result, they often fall behind in classwork and exhibit poor learning retention. This subtype is often overlooked until a decline in progress becomes apparent as the child moves into higher grade levels. Because they are not hyperactive, type I children are frequently not noticed. Type CT children exhibit characteristics similar to both type HI and type I, which confounds their ability to function socially and academically. As a result, these children fall behind their peers in both social and cognitive development.

There are several criterion that must be met for an individual to be diagnosed with ADD/ADHD: persistent pattern of ADD/ADHD characteristic symptoms occurring more frequently and severe than in other individuals of similar development, (b) the presence of some impairment causing symptoms before the age of 7, (c) impairment present in at least two settings (e.g., home and school or work), (d) evidence of impairment of

development in age-appropriate social, academic, or occupational functioning, and (e) the symptoms do not occur exclusively during episodes of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and cannot better be explained by the diagnosis of another mental disorder such as a Mood or Personality Disorder (APA, 1994). Combined Type is diagnosed when the individual meets six or more of the criterion for inattention and hyperactivity-impulsivity for at least six months (see Appendix II for the Diagnostic Criteria). Inattentive is diagnosed when six of the criterion for impulsivity are met for at least six months but six criterion are not met for hyperactivity-impulsivity. Hyperactive/Impulsive is diagnosed when six of the criterion for hyperactivity-impulsivty are met for at least six months but six criterion are not met for inattention. Most children with ADD/ADHD are diagnosed as Combined Type (APA, 1994).

Since the late 1800's serious head trauma was often correlated with excessive mobility and inattentive behavior. In 1902, G. F. Still described "defect in moral control" as a disorder of some children who had little self-control – seen more frequently in males (Goldstein & Goldstein, 1992). Historically ADD/ADHD was labeled as minimal brain damage when it was identified after World War I. Children who had had an encephalitis infection (i.e., an infection of the brain and spinal tissues that usually results from an infection by viral vector and often results in swelling of the tissue and fluid accumulation) displayed symptoms of hyperactivity and loss of attention span. It was not until children who had not suffered an encephalitis infection began displaying similar symptoms that the label was changed to minimal brain dysfunction (Moghadam, 1988),

which was used as diagnostic terminology as recently as 1981 (as reported in one survey). The contemporary diagnosis is ADD/ADHD. The treatment of ADHD with stimulants began in 1937 when the administration of Benzedrine by Dr. Charles Bradley had a placating effect on ADHD symptoms (Moghadam, 1988). Contemporary treatments of ADD/ADHD include medication, behavioral modification, and programs designed to teach afflicted children to control their symptoms so that they are able to function within the school system and within their social network.

ADD is a problem in today's schools that is frequently overlooked, mislabeled, or ignored. The successful treatment of this disorder relies on early detection and treatment to fully realize the social and academic potential of the afflicted child. Detection of this disorder relies heavily on teacher and physician knowledge of ADD/ADHD. The frequency of ADD/ADHD in some degree of severity is 15% to 20% of elementary aged children (Gordon, 1994). The frequency of ADD/ADHD is 6.7% to 9.5% in all school aged children and 10% to 25% of ADD/ADHD children have a co-morbid learning disability. The frequency of children with a learning disorder that are also ADD/ADHD is 30% to 50% (Cramer & Ellis, 1996). The implications of these statistics carry beyond education. Children with ADD/ADHD qualify for modified educational programs, but they first must be identified and diagnosed. Without early intervention (when it is most beneficial), the unameliorated symptoms of ADD/ADHD continue into adulthood often resulting in social adjustment problems and a reduced ability to function in the workplace (Cramer & Ellis, 1996). The ADHD child is also likely to suffer from low self-esteem,

depression, and isolation when they are unable to connect with their peers on a social level due to aversive behaviors such as physical aggression or interrupting (Goldstein & Goldstein, 1992).

Another important consideration is the genetic heritability coefficient for ADD/ADHD, which on average is as high as 0.8 thus distinguishing ADD/ADHD as the most heritable behavioral disorder (Cramer & Ellis 1996). This suggests that often parents of an ADD/ADHD child also exhibit ADD/ADHD symptoms, which can make interventions such as medication and behavioral modification less productive due to lack of enforcement and consistency by the parents.

Introduction

The purpose of this study included: (a) describing the distribution of gender within and among the subtypes (I, HI, CT), (b) observing any differences among subtypes with regard to the ages of diagnosis, (c) analyzing characteristics affecting medication usefulness, (d) analyzing characteristics affecting the effectiveness of behavioral modifications, and (e) analyzing the effects of communication (e.g., among parents, teachers, and physicians) on the improvement of a child's symptoms.

Hypotheses

SubType Differences:

- There will be more males then females with type HI.
- There will be more females than males with type I.
- There will be more males overall.
- There will be more type HI than type CT or type I.
- Type HI and type CT will be diagnosed at a younger age.

Diagnosis:

- Children with more contributing factors (i.e., overacting, impulsiveness) for seeking help will be diagnosed at a younger age.

Medication Usefulness:

- Medication will be rated as more helpful for individuals with more severe ADHD.
- Medication will be rated as more helpful as the length of time on medication increases.
- Medication's rated helpfulness will be dependent on both the severity of ADHD and the length of time on medication.

Behavioral Modification Usefulness:

- Type of behavioral modification will affect its usefulness.
- Younger children will be rated to benefit more from behavioral modifications.

Parent/Teacher Communication Usefulness:

- More frequent communication will result in more class skills improvement.
- More frequent communication will result in more social skills improvement.
- Higher quality ratings of communication will result in more class skills improvement.
- Higher quality ratings of communication will result in more social skills improvement.
- Class skills improvement will be affected more by quality of communication than by frequency of communication.
- Social skills improvement will be affected more by quality of communication than by frequency of communication.
- Classroom adjustments will be more effective for class skills when quality of communication is high.
- Classroom adjustments will be more effective for social skills when quality of communication is high.

Parent/Physician Communication Usefulness:

- More frequent communication will result in more class skills improvement.
- More frequent communication will result in more social skills improvement.
- Higher quality ratings of communication will result in more class skills improvement.
- Higher quality ratings of communication will result in more social skills improvement.
- Higher quality ratings of communication will result in medication being more helpful.

Teacher/Physician Communication Usefulness:

- Higher quality ratings of communication will result in more class skills improvement.
- Higher quality ratings of communication will result in more social skills improvement.

Program for Class Skills Usefulness:

- Program will be rated as more useful as the time spent in the program increases.

Program for Social Skills Usefulness:

- Program will be rated as more useful as the time spent in the program increases.

Measure:

Based on literature review and personal experience by the investigator, the survey measure was developed with specific goals in mind for the purpose of this study (survey included in Appendix III). The investigator wrote the survey and edited it in deference to feedback received from advisors. Part A (background information) requested information that could be used to categorize subject data (e.g., age, subtype of ADD/ADHD, type of prescription drugs for ADD/ADHD) for further analysis. Part B (details/current situation) used a combination of yes/no questions, circle all that apply questions, and Likert scales (i.e., a numeric scale for rating effectiveness of communication, etc.) to gather information about home/school behavior, classroom ability, and communication (e.g., frequency, quality, and effect) between parent/teacher, parent/physician, and teacher/physician. Short answer questions were used to identify any factors effecting the responses made and to make suggestions about how to improve communication between parents/teachers, parents/physicians, and teachers/physicians.

Subjects and Procedure:

Data was collected via mailed surveys through an organization known as Children and Adults with Attention Deficit Disorder (CH.A.D.D.). Through phone solicitation (i.e., chapter coordinators identified through a phone list on the Internet), approximately 55 chapters were contacted and requested to help distribute surveys. Fifty (91%) chapters

agreed to participate. Of those that did not participate, one chapter had disbanded, three chapters had irregular meetings, and one chapter coordinator refused to hand out surveys unless the surveys were tailored to her specifications. Each chapter distributed 5 to 60 surveys (depending on chapter size) at meetings held in December 1997 through February 1998 and explained to the participants what the survey entailed. One chapter did not have meeting so they distributed the surveys by mail. Parents of children with ADD/ADHD were asked to complete the survey and sign a consent form that would be separated from their survey when returned by mail. Each survey took about 40 minutes to complete and a return envelope with postage was provided. At the deadline (February 28, 1998), 50 out of 1000 surveys had been returned (5%).)[1]

Subjects were categorized into three different groups based on reported subtype of ADHD: Inattentive (I) (n=14), Hyperactive/Impulsive (HI) (n=27), and Combined Type (CT) (n=11). There were more males 85.10% (n=23) than females 14.81% (n=4) with type HI. As shown in Table 1, there were not more females 35.71% (n=5) than males 64.29% (n=9) with type I. There were more type HI 51.92% (n=27) than either type I 26.92% (n=14) or type CT 21.15% (n=11). There were more type HI 51.92 % (n=27) than type I and type CT combined 48.08% (n=25).

Data Analysis:

Data was analyzed using a student statistics program called StataQuest^{tm}. A table of subject survey responses was formed and ANOVA and χ^2 tests were performed to identify any significant differences among groups. The significance level was adjusted

from α=0.05 to an appropriate α using Bonferoni's procedure, which is designed to correct for chance correlation obtained by performing multiple analyses on one data set. When significance was found using ANOVA, Tukey's post hoc comparison was used to pinpoint the variation between subtypes. Spearman correlation coefficient tables were complied and Bonferoni's procedure was used again to determine appropriate α levels. From the hypotheses, regression and multiple regression were used to determine the predictability of data variables at an appropriate α level and to determine the amount of variation explained by the resulting model.

Results

Chapter 1: Subject Survey Responses[2]

Subjects were categorized into three different groups based on reported subtype of ADHD: Inattentive (I) (n=14), Hyperactive/Impulsive (HI) (n=27), and Combined Type (CT) (n=11). There were more males 85.10% (n=23) than females 14.81% (n=4) with type HI. There were not more females 35.71% (n=5) than males 64.29% (n=9) with type I. There were more type HI 51.92% (n=27) than either type I 26.92% (n=14) or type CT 21.15% (n=11). There were more type HI 51.92 % (n=27) than type I and type CT combined 48.08% (n=25). ANOVA found significant difference (trend at adjusted α=0.0043, $p < 0.0024$) between the subtypes with regard to age of diagnosis. Using Tukey's procedure (α=0.05), type I (M=9.29, SD=3.34) was found to be significantly different from both type HI (M=6.45, SD=2.25) and type CT (M=6.32, SD=1.62), but there was no significant difference between type HI and type CT. Simple regression was conduced with Age of Diagnosis as criterion variable and Subtype as predictor variable. The resulting equation indicated a significant prediction of Age of Diagnosis based on the linear regression of Subtype, F (1, 50)=9.38, $p < 0.0354$, R^2=0.16, Adj. R^2=0.14.

χ^2 test of Amount of Time in Skills Program found significant difference between subtypes, χ^2 (2, n=5)=3.83, $p < 0.0254$. This difference was primarily due to the very small n=5. ANOVA yielded significant difference among the subtypes with regard to quality of parent/physician communication (α=0.0022, $p < 0.0003$). Tukey's procedure

revealed a difference between type CT (M=2.47, SD=1.07) and type I (M=4.07, SD=1.07) and type HI (M=4.27, SD=1.15); however, no significant difference was found between type I and type HI. Subtype was then adjusted (type I and type HI were treated as one subtype while type CT was treated as another) before any additional tests were carried out. Simple regression was conducted with Quality of Parent/Physician Communication as the criterion variable and adjusted Subtype as the predictor variable. The resulting equation indicated a significant prediction of Quality of Parent/Physician Communication based on the linear regression of adjusted Subtype, F (1, 48)=11.85, p < 0.0012, R^2=0.20, Adj. R^2=0.18.

ANOVA yielded significant difference among the subtypes with regard to the Amount that Parent/Physician Communication Helps Improve Schoolwork (α=0.0022, p < 0.0001). Tukey's procedure revealed a difference between type CT (M=1.36, SD=0.67) and type I (M=3.43, SD=1.28) and type HI (M=3.40, SD=1.29); however, no significant difference was found between type I and type HI. Subtype was then adjusted (type I and type HI were treated as one subtype while CT was treated as another) before any additional tests were carried out. Simple regression was conduced with Quality of Parent/Physician Communication as the criterion variable and adjusted Subtype as the predictor variable. The resulting equation indicated a significant prediction of Quality of Parent/Physician Communication based on the linear regression of adjusted Subtype, F (1, 47)=18.49, p < 0.0001, R^2=0.28, Adj. R^2=0.27. ANOVA yielded significant difference among the subtypes with regard to the Amount that Parent/Physician Communication Helps Improve Social Skills (α=0.0022, p< 0.0015). Tukey's procedure

revealed a difference between type CT (M=0.27, SD=0.44) and type I (M=0.93, SD=1.38) and type HI (M=3.00, SD=1.36); however, no significant difference was found between type I and type HI. Subtype was then adjusted (type I and type HI were treated as one subtype while type CT was treated as another) before any additional tests were carried out. Simple regression was performed with Quality of Parent/Physician Communication as the criterion variable and adjusted Subtype as the predictor variable. The resulting equation indicated a significant prediction of Quality of Parent/Physician Communication based on the linear regression of adjusted Subtype, F (1, 48)=2.26, p < 0.0015, R^2=0.20, Adj. R^2=0.17. ANOVA yielded significant difference among the subtypes with regard to the Quality of Teacher/Physician Communication; however, due to the small number of responses (n = 5), no appropriate statistics could be run.

Spearman correlation coefficients flagged several items as significant. Regression analysis was performed on these items with the following results. As shown in Table 3, the Frequency of Parent/Physician Communication and the Amount Parent/Physician Communication Helped Class Work yielded a moderate correlation (r=0.6334, p<0.0001). Simple regression was performed with Amount Parent/Physician Communication Helped Class Work as criterion variable and Frequency of Parent/Physician Communication as predictor variable. The resulting equation indicated a significant prediction with Amount Parent/Physician Communication Helped Class Work based on the linear regression of Frequency of Parent/Physician Communication, F (1, 47)=33.40, $p < 0.0001$, R^2=0.42, Adj. R^2=0.40. As shown in Table 3, the Frequency of Parent/Physician Communication and the Amount Parent/Physician Communication Helped Social Skills yielded a moderately weak correlation (r=0.4700, p<0.0006). Simple regression was performed with Amount Parent/Physician Communication Helped Social Skills as criterion variable and Frequency of Parent/Physician Communication as predictor variable. The resulting equation indicated a significant prediction with Amount Parent/Physician Communication Helped Social Skills based on the linear regression of Frequency of Parent/Physician Communication, F (1, 48)=14.04, $p < 0.0005$, R^2=0.22, Adj. R^2=0.21. As shown in Table 3, the Quality of Parent/Physician Communication and the Amount Parent/Physician Communication Helped Class Work yielded a moderately strong correlation (r=0.7795, p<0.0001). Simple regression was performed with Amount

Parent/Physician Communication Helped Class Work as criterion variable and Quality of Parent/Physician Communication as predictor variable. The resulting equation indicated a significant prediction with Amount Parent/Physician Communication Helped Class Work based on the linear regression of Quality of Parent/Physician Communication, F (1, 46)=68.36, $p < 0.0001$, R^2=0.60, Adj. R^2=0.59. As shown in Table 3, the Quality of Parent/Physician Communication and the Amount Parent/Physician Communication Helped Social Skills yielded a moderately strong correlation (r=0.7572, p<0.0001). Simple regression was performed with Amount Parent/Physician Communication Helped Social Skills as criterion variable and Quality of Parent/Physician Communication as predictor variable. The resulting equation indicated a significant prediction with Amount Parent/Physician Communication Helped Social Skills based on the linear regression of Quality of Parent/Physician Communication, F (1, 47)=54.17, $p < 0.0001$, R^2=0.54, Adj. R^2=0.53. As shown in Table 4, the Quality of Parent/Teacher Communication and the Amount Parent/Teacher Communication Helped Class Work yielded a strong correlation (r=0.8455, p<0.0001). Simple regression was performed with Amount Parent/Teacher Communication Helped Class Work as criterion variable and Quality of Parent/Teacher Communication as predictor variable. The resulting equation indicated a significant prediction with Amount Parent/Teacher Communication Helped Class Work based on the linear regression of Quality of Parent/Teacher Communication, F (1, 47)=76.73, p<0.0001, R^2=0.62, Adj. R^2=0.61. As shown in Table 4, the Quality of Parent/Teacher Communication and the Amount Parent/Teacher Communication Helped Social Skills yielded a moderately strong correlation (r=0.7716, p<0.0001). Simple regression was

performed with Amount Parent/Teacher Communication Helped Social Skills as criterion variable and Quality of Parent/Teacher Communication as predictor variable. The resulting equation indicated a significant prediction with Amount Parent/Teacher Communication Helped Social Skills based on the linear regression of Quality of Parent/Teacher Communication, F (1, 46)=40.21, $p < 0.0001$, R^2=0.47, Adj. R^2=0.45. As shown in Table 4, the Quality of Parent/Teacher Communication and the Amount Adjusted Classroom Helped Class Work yielded a moderately strong correlation (r=0.6871, p<0.0001). Simple regression was performed with Amount Adjusted Classroom Helped Class Work as criterion variable and Quality of Parent/Teacher Communication as predictor variable. The resulting equation indicated a significant prediction with Amount Adjusted Classroom Helped Class Work based on the linear regression of Quality of Parent/Teacher Communication, F (1, 42)=31.98, $p < 0.0001$, R^2=0.43, Adj. R^2=0.42. As shown in Table 4, the Quality of Parent/Teacher Communication and the Amount Adjusted Classroom Helped Social Skills yielded a moderate correlation (r=0.5964, p<0.0001). Simple regression was performed with Amount Adjusted Classroom Helped Social Skills as criterion variable and Quality of Parent/Teacher Communication as predictor variable. The resulting equation indicated a significant prediction with Amount Adjusted Classroom Helped Social Skills based on the linear regression of Quality of Parent/Teacher Communication, F (1, 40)=20.55, $p <$ 0.0001, R^2=0.34, Adj. R^2=0.33. As shown in Table 5, the Quality of Teacher/Physician Communication and the Amount Teacher/Physician Communication Helped Class Work

yielded a very strong correlation ($r=0.9718$, $p<0.0003$). Simple regression was performed with Amount Teacher/Physician Communication Helped Class Work as criterion variable and Quality of Teacher/Physician Communication as predictor variable. The resulting equation indicated a significant prediction with Amount Teacher/Physician Communication Helped Class Work based on the linear regression of Quality of Teacher/Physician Communication, F (1, 5)=38.04, $p < 0.0016$, $R^2=0.88$, Adj. $R^2=0.86$. As shown in Table 5, the Quality of Teacher/Physician Communication and the Amount Teacher/Physician Communication Helped Social Skills yielded a very strong trend ($r=0.9337$, $p<0.0021$). Simple regression was performed with Amount Teacher/Physician Communication Helped Social Skills as criterion variable and Quality of Teacher/Physician Communication as predictor variable. The resulting equation indicated a significant prediction with Amount Teacher/Physician Communication Helped Social Skills based on the linear regression of Quality of Teacher/Physician Communication, F (1, 5)=15.11, $p < 0.0116$, $R^2=0.75$, Adj. $R^2=0.70$.[3]

Subtype Differences:[2] There were more males 85.19% (n=23) than females 14.81% (n=4) with type HI. A t test was used to examine significance with the following result: t (26, n=27)= -8.29, $p < 0.0001$. There were more males 64.29% (n=9) than females 35.71% (n=5) with type I, t (13, n=14)= -1.07, $p < 0.3019$. There were more males 78.85% (n=41) than females 21.15% (n=11) overall, t (51, n=52)= -6.17, $p<0.0001$. There were more subjects with type HI 51.92% (n=27) than with type I 26.92% (n=14), t (40, n=41)= 2.11, $p < 0.0408$. There were more subjects with type HI 51.92% (n=27) than with type CT 21.15% (n=11), t (37, n=38)= 2.82, $p < 0.0076$. There was evidence that type HI and type CT were diagnosed at a younger age (see Subject Survey Responses, Chapter 1).

Diagnosis: No significant difference was found between the Number of Contributing Factors for Seeking Help and the Age of Diagnosis.

Medication Usefulness: No significance was found to support Medication being More Helpful for individuals with more Severe ADHD. No significance was found to support Medication being More Helpful as the Length of Time on Medication increased. No significance was found to support Medication Helpfulness' dependence on a combination of Severity of ADHD and Length of Time on Medication.

Behavior Modification Usefulness: No significant difference was found in regard to the Type of Classroom Adjustment affecting Helpfulness of Classroom Adjustments. A limit to this test was placed by the nature of the survey: there was no

method for indicating which classroom adjustment was more helpful or for ranking each adjustment individually. Therefore, each Type of Classroom Adjustment tested could have been used alone or in combination. As shown in Table 2, Hand Signals, Structured Assignments, and Other were the three most useful classroom adjustments for helping classroom skills in type I. As shown in Table 2, Individual Attention, Structured Assignments, and Computer Teaching were the three most useful classroom adjustments for helping classroom skills in type HI. As shown in Table 2, Individual Attention, Less Homework, and Structured Assignments were the three most useful classroom adjustments for helping classroom skills in type CT. As shown in Table 2, Structured Assignments seemed to be the most useful adjustment for helping social skills. No significant difference was found to support a correlation between Age and Helpfulness of Behavioral Modifications.

Parent/Teacher Communication Usefulness: As Frequency of Parent/Teacher Communication increased, there was no significant correlation with either Amount Parent/Teacher Communication Helped Class Work or in Amount Parent/Teacher Communication Helped Social Skills. As shown in Table 1, as Quality of Parent/Teacher Communication increased there was a significant increase in the Amount Parent/Teacher Communication Helped Class Work as well as a significant increase in the Amount Parent/Teacher Communication Helped Social Skills (see Subject Survey Responses, Chapter 1). As shown in Table 1, as Quality of Parent/Teacher Communication increased there was a significant increase in the Amount Adjusted Classroom Helped Class Work as well as a significant increase in the Amount Adjusted Classroom Helped Social Skills

(see Subject Survey Responses, Chapter 1).

Parent/Physician Usefulness: As shown in Table 1, as Frequency of Parent/Physician Communication increased there was a significant increase in the Amount Parent/Physician Communication Helped Class Work as well as a significant increase in the Amount Parent/Physician Communication Helped Social Skills (see Subject Survey Responses, Chapter 1). As shown in Table 1, as Quality of Parent/Physician Communication increased there was a significant increase in the Amount Parent/Physician Communication Helped Class Work as well as a significant increase in the Amount Parent/Physician Communication Helped Social Skills (see Subject Survey Responses). There was no significance in Quality Parent/Physician Communication resulting in Medication Helpfulness.

Teacher/Physician Communication Usefulness: As shown in Table 1, as Quality of Teacher/Physician Communication increased there was a significant increase in the Amount Teacher/Physician Communication Helped Class Work as well as a significant increase in the Amount Teacher/Physician Communication Helped Social Skills (see Subject Survey Responses, Chapter 1).

Program for Class Skills Usefulness: There was no significant relationship found between the Amount of Time in a Class Skills Program and the Helpfulness of the Program.

Program for Social Skills Usefulness: There was no significant relationship found between the Amount of Time in a Social Skills Program and the Helpfulness of the Program.

Chapter 4: Discussion

The present study examined the characteristics of children with ADHD with regard to subtype and the effectiveness of various interventions. The major findings of this study included: (a) quality of communication between parents and teachers was a good indicator for predicting how well communication would help classwork and social skills, (b) quality of communication between parents and physicians was a better indicator than frequency of communication for predicting how well communication would help classwork and social skills, and (c) quality of communication between teachers and physicians was a good indicator of how well communication would help classwork and social skills.

The results confirmed the larger number of boys versus girls for type HI and overall. Results did not support the hypothesis that there were more girls than boys for type I, but did demonstrate that the gender distribution for type I was more even than any other subtype. These overall findings are somewhat consistent with sex ratios of 4:1 to 9:1 published by the DSM-IV. An overall ratio of 4:1 was obtained. If type I and types HI and CT are separated, a ratio of 2:1 for type I and a ratio of 5:1 for types HI and CT are obtained. The results also indicated that type HI was the predominant subtype (at least the predominant diagnosed subtype). This finding is not consistent with the predominant subtype identified in DSM-IV which was CT. This may have been due to sampling error or small sample size.

Modeling Age of Diagnosis based on subtype (14% of variance explained) indicated that Age of Diagnosis is significantly younger in both type HI and type CT.

This finding is logical since both subtypes are characterized by an overabundance of fidgeting and disruptive behavior in comparison to their peers. This suggests a potential lack of teacher awareness in the education system that allows type I students to pass unnoticed until their grades begin suffering.

No significant correlation emerged between the Number of Factors for Seeking Help and the Age of Diagnosis. This, in combination with the above findings regarding Age of Diagnosis by Subtype, suggests that the nature of the factor and its intensity, rather than multiple signals, lead to earlier diagnosis (e.g., severe hyperactivity grabs more attention than excessive daydreaming).

Medication Usefulness was not significantly affected by either Length of Time on Medication or by Severity of ADD. Instead, medication tended to be helpful regardless of subtype or severity after about two to three months of use.

As mentioned in the results section, severe limits existed on the malleability of the Behavior Modification Usefulness data. The manner in which the survey was written did not allow for the differentiation between multiple interventions with regard to ranking of helpfulness. Examining the different interventions, those that helped type I the most were interventions designed to help them focus on a task for shorter periods of time, which they could handle better than traditional testing and teaching methods (Alone or in combination: Hand Signals, Structured Assignments, and Other interventions [including untimed testing, verbal testing, and help with perspective exercises]). Interventions that reportedly helped type HI the most were designed to curb inappropriate behavior through

extra attention or interactive learning (Alone or in combination: Individual Attention, Structured Assignments, and Computer Teaching). Interventions that helped type CT the most limited the time of focus and controlled inappropriate behaviors (Alone or in combination: Individual Attention, Less Homework, and Structured Assignments). All of the subtypes were helped by Structured Assignments, which implies that a first step to improving classroom skills is to provide ADHD students with a clear and concise set of instructions and expectations for the task at hand. Structured Assignments was the most helpful classroom adjustment for social skills overall, which suggests that without reason to act out or generally be distracted, children were more accepted by peers and teachers for displaying age appropriate behavior.

Although Frequency of Parent/Teacher Communication did not predict the Amount Parent/Teacher Communication Helps Classwork or Social Skills, Quality of Parent/Teacher Communication did predict both (61% and 45% of variance explained respectively). When parents communicated effectively with teachers, other interventions such as classroom adjustments and behavioral modifications were more likely to become an effective part of the interventions designed to help the student (see Exploratory Analysis for further details).

The model of Frequency of Parent/Physician Communication predicting the Amount Frequency of Parent/Physician Communication Helps Class Work explained 40% of the variance, whereas Quality of Parent/Physician Communication was able to explain 60% of the variance. Similarly, the model of Frequency of Parent/Physician Communication predicting Amount Frequency of Parent/Physician Communication

Helps Social Skills explained 21% of the variance whereas the Quality of Parent/Physician Communication was able to explain 53% of the variance. Although Parent/Physician Communication may seem like an unusual factor to influence a child's class and social development, physician also referred to a psychiatrist or a psychologist who was directly or indirectly involved in the learning process. The most satisfied parents with regard to the progress of their child were ones who had a psychiatrist or psychologist evaluating, monitoring, or actively participating in the cognitive and/or social development of the child.

Although Frequency of Teacher/Physician Communication did not predict for predicting the Amount Teacher/Physician Communication Helps Classwork or Social Skills, Quality of Teacher/Physician Communication predicted both (86% and 70% of variance explained respectively). This data must be interpreted with caution due to a small sample size (n=5); however, recognizing communication as a method for helping a child with ADHD is important. Most of the instances when teachers and physicians communicated occurred through parent moderation or message delivery.

No significant results were found relating the Amount of Time in a Class Program with its usefulness, nor was any significant findings observed relating the Amount of Time in a Skills Program with its usefulness. These findings are influenced by the type of program being implemented, which varied from Individualized Education Plans (IEP) to tutoring as needed. Additional studies need to be conducted to investigate this phenomenon further.

The characteristics of the group analyzed in this study are an integral factor

affecting the final outcome or the appearance of the results. Many of the subjects indicated a substantial disappointment in their school system. A primary reason for a large portion of the subjects not enrolling in a class or social skills program is that they are denied access due to a lack of a co-morbid learning disability. Under Section 504 of the Rehabilitation Act of 1973 and under part B of the Individuals with Disabilities Education Act (IDEA), ADD/ADHD is considered a disorder that entitles students to additional learning resources. Many of the schools in this study reportedly refused to help ADD/ADHD students because they believe they do not qualify for services. A factor in the lack of significance between a class or social skills enrollment and its usefulness is that a large portion of those enrolled had a co-morbid disorder. Consequently, the program they participated in was designed to help their classroom or social skills, but the design of the program addressed another co-morbid problem and not ADD/ADHD.

The comments section provided a wealth of ideas to help improve the status of an ADHD child. Teacher education was emphasized heavily. Parents felt that teachers are not informed about ADHD and its associated needs. A period of training or a special class designed to introduce teachers to learning and social disorders was recommended by many parents. Some also felt that physicians needed more training. One mother reported her 11-year-old son was institutionalized by the family doctor. Thankfully, the staff and doctors at the hospital recognized ADD and sent the child home for outpatient care. Communication was another large stumbling block. There were parents who felt teachers and physicians should communicate and there were parents who felt teachers

and physicians should not communicate based on a negative experience with teacher/physician communication. A compromise was found through parent mediated communication. The interesting (and disturbing) fact is that many of the subjects who reported the most improvement of symptoms invested in outside help from counselors or psychiatrists, removed their children from the public school system, or took them to outside education centers for learning supplements. This indicates that lower or middle income children with ADD/ADHD must do their best within a school system that may be unwilling and/or currently unable (i.e., due to overcrowding, poor or small school district) to handle their needs.

Limits of Current Study

The current study utilized an ADD/ADHD support group called CH.A.D.D. for a data source. Therefore, information reported came from a pool of subjects motivated to improve their child's ADD/ADHD symptoms. These results may not be representative of the population of parents of ADD/ADHD children and cannot be generalized to include parents not affiliated with CH.A.D.D. chapters. It is also possible that parents who filled out the survey were either very satisfied or very dissatisfied with the treatment their child was receiving. It is also possible that more parents who were dissatisfied were more likely to return surveys because they are disgruntled.

Other limits of the study include a relatively small sample size and receiving data from a single format and source (i.e., parents reported information on a survey as they interpreted it). Information from teachers and physicians was also considered important, but was not feasible for the current study. This implicates that some significant findings may have been found due to the source of data and the variance due to a small sample size.

Recommendations for Future Research

Time was a limiting factor in this study. Future studies should allow more time for surveys to be returned and reminder letters should be sent to encourage a higher return. Other organizations should be contacted as a source for subjects. If possible, subjects could be identified through a school system which would provide a more representative subject pool. Data should be collected through interview format of

parents, teachers, and physicians which would provide multiple sources for comparison. The type of communication (i.e., what is discussed: behavior, possible improvements for a classroom program) between parents/teachers, parents/physicians, and teachers/physicians should be identified. The format of four questions from the survey (#18, 19, 21, 22) would need modification; a rating scale for the helpfulness of each different classroom adjustment/behavioral modification for improvement of classroom/social skills. An additional question specifically requesting subjects to list any co-morbid disorder should be included. This information should be used to analyze data based on the presence/absence of a co-morbid disorder and also on the type of the disorder. When teachers and physicians are interviewed, they should be questioned about acceptance of ADD/ADHD as a possible diagnosis. In the present study, subjects indicated that teachers and some physicians were unwilling to accept ADD/ADHD as a valid disorder. A study of teacher/physician acceptability of ADD/ADHD as a diagnosis would provide a basis for the development of different strategies to inform teachers and physicians about the realities of ADD/ADHD.

Chapter 6: Conclusions

1. Quality of communication is more important than frequency of communication (yet they are related) in determining the level of helpfulness obtained from that communication regardless of who is communicating (i.e., parent/teacher, parent/physician, or teacher/physician).
2. Subtype is a significant factor that affects Age of Diagnosis, which in turn has long term implications with regard to relationships and ability to function in the workplace.

Chapter 7: Exploratory Analysis[4]

The purpose of this section is to highlight any interesting exploratory findings. ANOVA yielded significant difference (adjusted α=0.0022, $p < 0.0003$) between the subtypes with regard to Quality of Parent/Physician Communication. Using Tukey's procedure (α=0.05), type CT (M=2.47, SD=1.07) was found to be significantly different from both type I (M=4.07, SD=1.07) and type HI (M=4.27, SD=2.47), but no significant difference emerged between type I and type HI. Simple regression was performed with Quality of Parent/Physician Communication as criterion variable and Subtype as predictor variable. The resulting equation indicated a significant prediction of Quality of Parent/Physician Communication based on the linear regression of Subtype, F (1, 48)=8.19, $p < 0.0062$, R^2=0.15, Adj. R^2=0.13. ANOVA also yielded significant differences for how much Amount Parent/Physician Communication Helps Schoolwork (p<0.0001) and how much Amount Parent/Physician Communication Helps Social Skills (p<0.0015). Tukey's procedure confirmed the same division between the subtypes that was found in the Quality of Parent/Physician communication. The Amount Parent/Physician Communication and Subtype yielded a negative moderately weak trend (r= -0.4468, p<0.0013). Simple regression was performed with Amount Parent/Physician Communication Helped Class Skills as criterion variable and Subtype as predictor variable. The resulting equation indicated a significant prediction with Amount Parent/Physician Communication Helped Class Skills based on the linear regression of Subtype, F (1, 47)=12.86, $p < 0.0008$, R^2=0.22, Adj. R^2=0.20. This is noteworthy

because it implies that type CT, which has the most need for intervention, is suffering because of poor communication. Heredity may be a factor involved if the child's parent or parents is/are type CT.

ANOVA also yielded a significant group difference between subtypes with regard to the Quality of Teacher/Physician Communication (the same pattern was observed by data inspection), but due to a small sample size (n=5), no appropriate statistics were run.

The Amount Classroom Adjustments Helped Classwork yielded a moderate correlation with the Amount Behavioral Modification Helps Classwork (r=0.5559, p<0.0001), a moderately strong correlation with the Amount Parent/Teacher Communication Helps Classwork (r=0.6990, p<0.0001), a moderately strong correlation with the Amount Parent/Teacher Communication Helps Social Skills (r=0.6639, p<0.0001) and a moderate correlation with the Number of Classroom Adjustments (r=0.5596, p<0.0001). Multiple regression was performed with Amount Classroom Adjustments Helped Classwork as criterion variable and Amount Behavioral Modification Helps Classwork, Amount Parent/Teacher Communication Helps Classwork, Amount Parent/Teacher Communication Helps Social Skills, and Number of Classroom Adjustments as predictor variables. The resulting equation indicated a significant prediction with Amount Classroom Adjustments Helped Classwork based on the linear regression of Amount Behavioral Modification Helps Classwork, Amount Parent/Teacher Communication Helps Classwork, Amount Parent/Teacher Communication Helps Social Skills, and Number of Classroom Adjustments, F (4, 35)=14.23, p < 0.0001, R^2=0.62, Adj. R^2=0.58.

The Amount Classroom Adjustments Helped Social Skills yielded a moderate correlation with the Amount Behavioral Modification Helps Classwork ($r=0.5862$, $p<0.0001$), a moderate correlation with the Amount Parent/Teacher Communication Helps Classwork ($r=0.5231$, $p<0.0004$), a moderately strong correlation with the Amount Parent/Teacher Communication Helps Social Skills ($r=0.7754$, $p<0.0001$) and a moderately weak trend with the Number of Classroom Adjustments ($r=0.4454$, $p<0.0024$). Multiple regression was performed with Amount Classroom Adjustments Helped Social Skills as criterion variable and Amount Behavioral Modification Helps Classwork, Amount Parent/Teacher Communication Helps Classwork, Amount Parent/Teacher Communication Helps Social Skills, and Number of Classroom Adjustments as predictor variables. The resulting equation indicated a significant prediction with Amount Classroom Adjustments Helped Classwork based on the linear regression of Amount Behavioral Modification Helps Classwork, Amount Parent/Teacher Communication Helps Classwork, Amount Parent/Teacher Communication Helps Social Skills, and Number of Classroom Adjustments, $F(4, 34)=26.45$, $p < 0.0001$, $R^2=0.76$, Adj. $R^2=0.73$.

Both models for predicting the Helpfulness of Classroom Adjustments for Classwork and for Social Skills explain a large portion of the variance in the data set. These may be very strong models for predicting the outcome of making adjustments to the classroom. It also demonstrates the multi-faceted nature of an intervention.

Further studies would need to reexamine the nature of what effects subtype has on communication with both teachers and physicians and to reexamine the influential factors surrounding classroom adjustments as a method of intervention.

Appendix I

Table 1: Subject Survey Responses

Variable	ADHD SubType I (n=14)	ADHD SubType HI (n=27)	ADHD SubType CT (n=11)	Total ADHD (n=52)
Age M(SD)	13.57(3.34)	11.43(3.49)	12.45(4.55)	12.22(3.74)
Age at Diagnosis[1] M(SD)	9.29(3.34)[a]	6.45(2.25)[b]	6.32(1.62)[b]	7.19(2.75)
# Years Post Diagnosis M(SD)	4.29(2.52)	4.97(3.54)	6.14(4.01)	5.05(3.40)
Gender n/%				
male	9/64.29	23/85.19	9/81.82	41/78.85
female	5/35.71	4/14.81	2/18.18	11/21.15
Grade M(SD)	7.57(3.44)	5.74(3.38)	6.36(3.47)	6.37(3.44)
Grade Lavel n/%				
preschool - 2	1/7.14	6/22.22	2/18.18	9/17.31
3 - 6	5/35.71	9/33.33	4/36.36	18/34.62
7 - 12+	8/57.14	12/44.44	5/45.45	25/48.08
Medication Type n/%				
none	2/14.29	1/3.70	0	3/5.77
ritalin	4/28.57	10/37.04	3/27.27	17/32.69
ritalin + other	3/21.43	4/14.81	1/9.09	8/15.38
other	5/35.71	12/44.44	7/63.64	24/46.15
Time on Medication n/%	(n=11)	(n=26)	(n=11)	(n=48)
0 - 2 months	2/18.18	2/7.69	0	4/8.33
2 - 6 months	0	1/3.85	2/18.18	3/6.25
6 - 12 months	2/18.18	2/7.69	1/9.09	5/10.42
12+ months	7/63.64	21/80.77	8/72.73	36/75.00
Medication Help M(SD)	(n=12)	(n=26)	(n=11)	(n=49)
	3.79(0.99)	4.12(0.99)	3.48(1.06)	3.89(1.02)
Severity M(SD)	3.32(0.87)	3.83(0.86)	4.11(0.90)	3.75(0.90)

Table 1 (continued)

Variable	ADHD SubType I (n=14)	ADHD SubType HI (n=27)	ADHD SubType CT (n=11)	Total ADHD (n=52)
Contributing Factors[4] n/%				
school behavior	9/64.24	16/59.26	10/90.91	35/67.31
home behavior	12/85.71	17/62.96	9/81.82	38/73.08
teacher suggestion	5/35.71	14/51.85	6/54.55	25/48.08
physician suggest.	0	1.37	1/9.09	2/2.95
other	2/14.29	3/11.11	4/36.36	9/17.31
# Contributing Factors M(SD)	2.00(0.68)	1.89(0.85)	2.73(1.10)	2.10(0.91)
Class Program Available n/%	(n=12)	(n=26)	(n=11)	(n=49)
yes	7/58.33	17/65.38	9/81.82	33/67.33
no	5/41.67	9/34.62	2/18.18	16/32.65
In Class Program n/%	(n=7)	(n=17)	(n=9)	(n=33)
yes	4/57.14	13/76.47	9/100	26/78.79
no	3/42.86	4/23.53	0	7/21.21
Time in Class Program n/%	(n=3)	(n=13)	(n=9)	(n=25)
0 - 2 months	0	2/15.38	1/11.11	3/12.00
3 - 6 months	1/33.33	1/7.69	1/11.11	3/12.00
7 - 12 months	0	2/15.38	0	2/8.00
12+ months	2/66.67	8/61.54	7/77.78	17/68.00
Class Program Help M(SD)	(n=4)	(n=13)	(n=9)	(n=26)
	4(1.15)	3.31(0.86)	3.72(0.96)	3.57(0.94)
Skills Program Available n/%	(n=13)	(n=23)	(n=10)	(n=46)
yes	4/30.77	7/30.43	1/10.00	12/26.09
no	9/69.23	16/69.57	9/90.00	34/73.91
In Skills Program n/%	(n=4)	(n=7)	(n=1)	(n=12)
yes	1/25.00	3/42.86	1/100	5/41.67
no	3/75.00	4/57.14	0	7/58.33

Table 1 (continued)

Variable	ADHD SubType			Total
	I	HI	CT	ADHD
	(n=14)	(n=27)	(n=11)	(n=52)
Time in Skills Program[3] n/%	(n=1)	(n=3)	(n=1)	(n=5)
0 - 2 months	0	2/66.67	0	2/40.00
3 - 6 months	0	0	1/100	1/20.00
7 - 12 months	0	0	0	0
12+ months	1/100	1/33.33	0	2/20.00
Skills Program Help M(SD)	(n=1)	(n=3)	(n=1)	(n=5)
	5.00(0.00)	3.67(1.53)	4.00(0.00)	4.00(1.22)
Classroom Adjustments[2] n/%				
none	1/7.14	6/22.22	0	7/13.46
individual attention	6/42.86	13/48.15	5/45.45	24/46.15
hand signals	2/14.27	6/22.22	1/9.09	9/17.31
less homework	2/14.27	9/33.33	3/27.27	14/26.92
structured assign.	2/14.27	4/14.81	3/27.27	9/17.31
sit near teacher	8/57.14	11/40.74	9/81.82	28/53.85
computer teaching	4/28.57	3/11.11	3/27.27	10/19.23
other	5/35.71	4/14.81	7/63.64	16/30.77
# Classroom Adjustments M(SD)	2.14(1.51)	1.85(1.38)	2.82(1.33)	2.13(1.43)
Adjustments Help Class	(n=13)	(n=23)	(n=11)	(n=47)
Work M(SD)	3.69(1.11)	3.26(1.29)	3.23(1.13)	3.37(1.20)
Adjustments Help Social	(n=13)	(n=20)	(n=11)	(n=44)
Skills M(SD)	2.62(1.26)	2.60(1.35)	2.59(1.53)	2.60(1.34)

Table 1 (continued)

Variable	ADHD SubType			Total
	I	HI	CT	ADHD
	(n=14)	(n=27)	(n=11)	(n=52)
Behavioral Modifications[2] n/%				
None	1/7.14	0	0	1/1.92
Reward system	10/71.43	22/81.48	9/81.82	41/78.85
Punishment system	8/57.14	11/40.74	7/63.64	26/50.00
+ reinforcement	6/42.86	20/74.07	9/81.82	35/67.31
Other	8/57.14	8/29.63	2/18.18	18/36.62
# Behavioral Modifications M(SD)	2.36(1.28)	2.22(1.05)	2.45(1.21)	2.31(1.13)
Helpfulness of Behavioral	(n=13)	(n=25)	(n=10)	(n=48)
Modifications M(SD)	3.62(1.12)	3.60(0.82)	2.83(1.12)	3.44(1.00)
Frequency of Communication	(n=14)	(n=26)	(n=11)	(n=51)
Parent/Teacher n/%				
Never	0	1/3.85	0	1/1.96
Rarely	1/7.14	1/3.85	0	2/3.92
1-2 times/semester	2/14.29	4/15.38	2/18.18	8/15.69
3-4 times/semester	3/21.43	3/11.54	1/9.09	7/13.73
Once a month	0	0	0	0
Twice a month	3/21.43	3/11.54	1/9.09	7/13.73
Once a week	1/7.14	9/34.62	3/27.27	13/25.49
Twice a week	1/7.14	2/7.69	3/27.27	6/11.76
Daily	3/21.43	3/11.54	1/9.09	7/13.73
Quality of Parent/Teacher	(n=13)	(n=25)	(n=11)	(n=49)
Communication M(SD)	3.62(1.06)	3.80(1.15)	3.75(0.89)	3.74(1.06)
Amount Parent/Teacher	(n=13)	(n=25)	(n=11)	(n=49)
Communication Helps				
Schoolwork M(SD)	3.62(1.39)	3.56(1.29)	3.39(1.28)	3.54(1.29)

Table 1 (continued)

Variable	ADHD SubType I (n=14)	ADHD SubType HI (n=27)	ADHD SubType CT (n=11)	Total ADHD (n=52)
Amount Parent/Teacher Communication Helps Social Skills M(SD)	(n=13) 3.15(1.14)	(n=25) 2.83(1.34)	(n=11) 2.57(1.56)	(n=49) 2.86(1.33)
Frequency of Communication Parent/Physician n/%	(n=13)	(n=24)	(n=11)	(n=48)
Never	0	0	1/9.09	1/1.92
Rarely	4/28.57	12/44.44	6/54.55	22/42.31
1-2 times/semester	2/14.29	0	2/18.18	4/7.69
3-4 times/semester	1/7.14	1/3.70	0	2/3.85
Once a month	2/14.29	1/25.93	2/18.18	11/21.15
Twice a month	4/28.57	6/22.22	0	10/19.23
Once a week	0	1/3.70	0	1/1.92
Twice a week	1/7.14	0	0	1/1.92
Daily	0	0	0	0
Quality of Parent/Physician Communication[4] M(SD)	(n=14) 4.07(1.07)[a]	(n=26) 4.27(1.15)[a]	(n=10) 2.47(1.07)[b]	(n=50) 3.85(1.30)
Amount Parent/Physician Communication Helps Schoolwork[5] M(SD)	(n=14) 3.43(1.28)[a]	(n=25) 3.40(1.29)[a]	(n=10) 1.36(0.67)[b]	(n=49) 2.99(1.44)
Amount Parent/Physician Communication Helps Social Skills[6] M(SD)	(n=14) 2.93(1.38)[a]	(n=26) 3.00(1.36)[a]	(n=10) 1.27(0.44)[b]	(n=50) 2.63(1.40)

Table 1 (continued)

Variable	ADHD SubType I (n=14)	ADHD SubType HI (n=27)	ADHD SubType CT (n=11)	Total ADHD (n=52)
Frequency of Communication Teacher/Physician n/%				
never	12/85.71	19/70.37	10/90.91	41/78.85
rarely	1/7.17	2/7.41	0	3/5.77
1-2 times/semester	0	2/7.41	1/9.09	3/5.77
3-4 times/semester	0	3/10.34	0	3/5.77
once a month	0	0	0	0
twice a month	0	0	0	0
once a week	0	0	0	0
twice a week	1/7.14	0	0	1/1.92
daily	0	0	0	0
Quality of Teacher/Physician Communication[7] M(SD)	(n=1) 5.00(0.00)	(n=5) 3.40(0.55)	(n=1) 1.00(0.00)	(n=7) 3.29(1.25)
Amount Teacher/Physician Communication Helps Schoolwork M(SD)	(n=1) 5.00(0.00)	(n=5) 3.00(1.00)	(n=1) 1.00(0.00)	(n=7) 3.00(1.41)
Amount Teacher/Physician Communication Helps Social Skills M(SD)	(n=1) 5.00(0.00)	(n=5) 2.40(1.14)	(n=1) 1.00(0.00)	(n=7) 2.57(1.51)
Most Helpful Treatment for Classwork[2] n/%				
medication	12/85.71	22/81.48	9/81.81	43/82.69
school program	3/21.43	1/3.70	2/18.18	6/11.54
adjusted classroom	3/21.43	4/14.81	2/18.18	9/17.31
behavior modification	3/21.43	0	2/18.18	5/9.62
other	3/21.43	1/14.81	0	4/7.69

Table 1 (continued)

Variable	ADHD SubType I (n=14)	ADHD SubType HI (n=27)	ADHD SubType CT (n=11)	Total ADHD (n=52)
Helpful Treatments for Classwork[2] n/%				
medication	13/92.86	27/100	10/90.91	49/94.23
school program	9/64.29	21/77.78	9/81.82	39/75.00
adjusted classroom	12/85.71	24/88.89	9/81.82	45/86.54
behavior modification	13/92.86	25/92.59	10/90.91	48/92.31
other	6/42.86	6/22.22	4/36.36	16/30.77
Most Helpful Treatment for Social Skills[2] n/%	(n=13)	(n=26)	(n=11)	(n=50)
medication	7/53.85	21/80.77	6/54.55	34/68.00
school program	2/15.38	1/3.85	2/18.18	5/10.00
adjusted classroom	1/7.69	2/7.69	2/18.18	5/10.00
behavior modification	5/38.46	3/11.54	4/36.36	12/24.00
other	1/15.38	2/7.69	3/27.27	6/12.00
Helpful Treatments for Social Skills[2] n/%	(n=13)	(n=26)	(n=11)	(n=50)
medication	12/92.31	26/100	10/90.91	48/96.00
school program	7/53.85	19/73.08	7/63.64	33/66.00
adjusted classroom	10/76.92	20/76.92	7/63.64	37/74.00
behavior modification	11/84.62	23/88.46	8/72.73	42/84.00
other	4/30.77	7/26.92	4/36.36	15/30.00

Note: Due to multiple comparisons, Bonferoni's procedure was used to establish an acceptable α level (i.e., 0.05/23 = 0.0022, 0.1/23 = 0.0043).

Note: Table includes both A priori (1) hypotheses as well as A posteriori (4, 5, 6, 7) observations.

Table 1 (continued)

1. Anova resulted in $\underline{p} < 0.0024$ (indicates trend rather than significant difference). Tukey's post-hoc comparison demonstrated a significant difference of means (indicated by different subscripts) at $\alpha = 0.05$.
2. More than one observation per subject possible. Percents add up to > 100.
3. χ^2 resulted in $\underline{p} < 0.0254$. There is a significant difference in the variance among the groups due to a very small n.
4. Anova resulted in $\underline{p} < 0.0003$. Tukey's post-hoc comparison demonstrated a significant difference of means (indicated by different subscripts) at $\alpha = 0.05$.
5. Anova resulted in $\underline{p} < 0.0001$. Tukey's post-hoc comparison demonstrated a significant difference of means (indicated by different subscripts) at $\alpha = 0.05$.
6. Anova resulted in $\underline{p} < 0.0015$. Tukey's post-hoc comparison demonstrated a significant difference of means (indicated by different subscripts) at $\alpha = 0.05$. Failed Bartlett's test of equal variance with $\underline{p} < 0.004$.
7. Anova indicated a difference of means, however due to small $\underline{n}$, no appropriate statistics were run.

Table 2: Helpfulness of Classroom Adjustments Based on Type

Variable	ADHD SubType			Total
	I	HI	CT	ADHD
Classroom Adjustments Help Classwork M(SD)				
individual attention	4.00(0.89)	4.08(0.79)	4.10(1.02)	4.07(0.83)
hand signals	4.50(0.71)	3.7191.11)	5.00(0.00)	4.00(1.05)
less homework	3.00(1.41)	3.89(1.36)	4.33(0.58)	3.68(1.23)
structured assign.	4.50(0.71)	4.25(0.96)	4.33(0.58)	4.33(0.58)
sit near teacher	3.75(1.04)	2.90(1.20)	3.36(1.03)	3.30(1.12)
computer teaching	4.00(1.41)	4.20(0.84)	3.67(0.58)	3.67(0.58)
other	4.33(0.82)	3.25(0.96)	3.08(1.02)	3.59(1.05)
Classroom Adjustments Help Social Skills M(SD)				
individual attention	3.17(0.98)	3.27(1.19)	3.10(1.75)	3.20(1.22)
hand signals	3.33(1.53)	3.29(0.95)	5.00(0.00)	3.45(1.23)
less homework	2.00(0.00)	3.00(1.29)	3.00(1.73)	2.91(1.30)
structured assign.	4.00(1.41)	3.67(1.15)	3.33(2.08)	3.63(1.41)
sit near teacher	2.56(1.13)	2.44(1.01)	2.79(1.63)	2.58(1.20)
computer teaching	3.75(1.50)	2.33(1.54)	3.00(1.73)	3.10(1.45)
other	2.80(1.30)	1.33(0.58)	2.92(1.50)	2.54(1.37)

Table 3: Spearman Correlation Coefficient Part 1

	SubType	Frq Phys Com	Qul Phys Com	Phys Hlp Class	Phy Hlp Social	Medication Hlp	B- Mod Help	Class Adj Help	Social Adj Help
SubType	—	-0.3032	-0.348	-0.4468	-0.3758	-0.0942	-0.2438	-0.1546	-0.0100
Freq. Phys Com		—	0.5192	0.6334[1]	0.4700[2]	0.3710	0.5157	0.3016	0.3282
Qual. Phys Com			—	0.7795[3]	0.7572[4]	0.4195	0.2699	0.1884	0.1135
Phys Help Class				—	0.8123	0.5456	0.5572	0.3543	0.3793
Phys Help Social					—	0.3239	0.3949	0.1634	0.3251
Medication Helpful						—	0.3189	0.3475	0.0791
Behavior Mod Help							—	0.5559	0.5862
Class Adj Help								—	0.6695
Social Adj Help									—

Note: Due to multiple comparisons, Bonferoni's procedure was used to establish an acceptable α level (i.e., $0.05/36 = 0.0012$, $0.10/36 = 0.0028$).

1. $p < 0.0001$ – (Moderate Correlation) Frequency of parent/physician communication good indicator for improvement in class skills.
2. $p < 0.0006$ – (Moderately Weak Correlation) Frequency of parent/physician communication good indicator for improvement in social skills.
3. $p < 0.0001$ – (Moderately Strong Correlation) Quality of parent/physician communication is a very good indicator for improvement in class skills.
4. $p < 0.0001$ – (Moderately Strong Correlation) Quality of parent/physician communication is a very good indicator for improvement in social skills.

Table 4: Spearman Correlation Coefficient Part 2

	Frq Teach Com	Qul Teach Com	Teach Hlp Class	Teach Hlp Social	# Teach Adj	Class Adj Help	Social Adj Help	# Factors for Hlp	Behav Mod Hlp
Freq. Teach Com	—	0.2991	0.2685	0.1506	0.2526	0.2639	-0.1615	-0.2622	0.3474
Qual. Teach Com		—	0.8455[1]	0.7716[2]	0.3832	0.6871[3]	0.5964[4]	0.0323	0.3346
Teach Help Class			—	0.7399	0.4941	0.699	0.5231	-0.1088	0.2935
Teach Help Social				—	0.2362	0.6693	0.7754	-0.0402	0.4777
# Teach Adjust					—	0.5596	0.4454	-0.033	0.1959
Class Adjust Help						—	0.6695	-0.0023	0.5559
Social Adjust Help							—	-0.0658	0.5862
# Factors for Help								—	-0.1095
Behav Mod Help									—

Note: Due to multiple comparisons, Bonferoni's procedure was used to establish an acceptable α level (i.e., 0.05/36 = 0.0012, 0.10/36 = 0.0028).

1. $p < 0.0001$ – (Strong Correlation) There is a strong correlation between the effectiveness for classroom skill improvement due to parent/teacher communication and the quality of that communication.
2. $p < 0.0001$ – (Moderately Strong Correlation) These is a moderately strong correlation between the effectiveness for social skill improvement due to parent/teacher communication and the quality of that communication.
3. $p < 0.0001$ – (Moderately Strong Correlation) The better the quality of parent/teacher communication, the more likely classroom adjustments will improve class skills.
4. $p < 0.0001$ – (Moderate Correlation) The better the quality of parent/teacher communication, the more likely classroom adjustments will improve social skills.

Table 5: Spearman Correlation Coefficient Part 3

	SubType	Qual T/P Com	Freq T/P Com	Help T/P Class	Hlp T/P Social	Years PDx	Meds Help	Hlp Phys Class	Hlp Phy Social	Frq Teach Com
SubType	—	-0.8402	0.0104	-0.8165	-0.7485	0.1540	-0.0942	-0.4468	-0.3758	0.1069
Quality T/P Com		—	0.6566	0.9718[1]	0.9337[2]	0.7741	0.668	0.7451	0.667	-0.8271
Freq. T/P Com			—	0.5852	0.6468	0.0815	0.161	0.3572	0.3733	-0.1403
Helpful T/P Class				—	0.8333	0.6606	0.6999	0.6574	0.5893	-0.8412
Helpful T/P Social					—	0.8257	0.6593	0.8003	0.7267	-0.724
Years Post Dx						—	-0.0783	-0.1471	-0.1052	-0.1218
Mediaction Helpful							—	0.5456	0.3239	0.0893
Help Phys Class								—	0.8123	0.0693
Help Phys Social									—	-0.0421
Freq. Teach Com										—

Note: Due to multiple comparisons, Bonferoni's procedure was used to establish an acceptable α level (i.e., 0.05/45 = 0.0011, 0.1/45 = 0.0022)

1. $p < 0.0003$ – (Very Strong Correlation) Very strong correlation between the quality and helpfulness in regard to class skills of teacher/physician communication.
2. $p < 0.0021$ – (Very Strong Trend) Very strong correlation between the quality and helpfulness in regard to social skills of teacher/physician communication.

Appendix II

Diagnostic Criteria for Attention-Deficit/Hyperactivity Disorder:
(as published in DSM-IV)

A. Either (1) or (2):

(1) six (or more) of the following symptoms of **inattention** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Inattention

(a) often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
(b) often has difficulty sustaining attention in tasks or play activities
(c) often does not seem to listen when spoken to directly
(d) often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
(e) often has difficulty organizing tasks and activities
(f) often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
(g) often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
(h) is often easily distracted by extraneous stimuli
(i) is often forgetful in daily activities

(2) six (or more) of the following symptoms of **hyperactivity-impulsivity** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Hyperactivity

(a) often fidgets with hands or feet or squirms in seat
(b) often leaves seat in classroom or in other situations in which remaining in seat is expected
(c) often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
(d) often has difficulty playing or engaging in leisure activities quietly
(e) is often "on the go" or often acts as if "driven by a motor"
(f) often talks excessively

Diagnostic Criteria for Attention-Deficit/Hyperactivity Disorder (continued)

Impulsivity

(g) often blurts out answers before questions have been completed
(h) often has difficulty awaiting turn
(i) often interrupts or intrudes on others (e.g., buts into conversations or games)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g., at school [or work] and at home).

D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

Appendix III

CH.A.D.D. Chapters:

Thank you for agreeing to allow me to conduct my study through your organization. As we discussed over the phone, I have enclosed the following in this packet.

- 1-5 recruitment posters for the survey
- 5-60 surveys to be handed out among members and affiliates willing to participate in the study

Outline of survey procedure:

Participants (parent) will be requested to fill out a survey about their child with ADD/ADHD. Each participant will have a separate consent form and survey (except for parents who wish to submit jointly). Questions will cover classroom and home behavior, medication, school programs and progress of the child. There will also be a section at the bottom of the survey where participants can elaborate on any material they feel is relevant. It should take approximately 20-40 minutes to fill out each survey. Note: Direct access of medical records and scholastic records is **NOT** requested. Participants are asked to report on information requested. The participants will be provided an envelope with postage for returning the surveys.

Your Responsibilities:

- post the enclosed recruitment poster
- distribute surveys to parents who wish to participate

Questions regarding this survey should be directed to:

Michelle Delgadorodriguez (Principal Investigator)
P.O. Box. 7795
College Station, Tx. 77844
(409) 691-0330
e-Mail: mrd8490@unix.tamu.edu

This study will be completed in February 1998 and the data will be analyzed. As a participating chapter of CH.A.D.D. you will receive a report of the findings of the study by mid May. Please hand out these surveys as soon as possible. I need them back by mid February.

Thanks for your cooperation.

Michelle Delgadorodriguez, Principal Investigator

Attention!

Participants needed in a survey regarding how children are treated for ADD/ADHD in the home and at school.

***eligibility - CH.A.D.D. member or affiliate with a child with ADD/ADHD**

***benefits - advancement of the knowledge about the diagnosis and treatment of ADD/ADHD**

***compensation - none, however, participating CH.A.D.D. chapters will receive a report on results found**

***location of the study - survey format, fill out in the comfort of your home**

Principal Investigator: Michelle Delgadorodriguez
P.O. Box 7795
College Station, Tx. 77844
(409) 691-0330

Informed Consent

The purpose of this study is to investigate a possible correlation between the successful treatment of ADD/ADHD and the subtype (Inattentive vs. Hyperactive/Impulsive vs. Combined Type) of ADD/ADHD the child has. The principal investigator is conducting this study as an independent honors research project sponsored by the Undergraduate Fellows program at Texas A & M University. This study will be conducted through a set of surveys to be filled out and returned by February 15th 1998. There will be approximately 1000 surveys mailed out. Participants (parent(s) of children with ADD/ADHD) will be asked to complete a questionnaire that will asses some key information about the child in question, such as age, gender and type & severity of ADHD as well as current progress.

I will read the statements below and have been given a copy of this consent form for my records. By signing this form at the bottom, I will have indicated that I am willing to participate in this study.

- I understand that I will be responsible for filling out the enclosed survey in my home, office, etc. and returning it in the pre-addressed, stamped envelope provided by **February 15th 1998.** I understand that I am free to decline answering any question(s) I find uncomfortable.
- I understand that as parents, the survey can be filled out jointly (Please indicate by having both parties sign consent form).
- I understand that there are no known risks associated with participating in this study and that I am free to withdraw at any time without harming my status as a member or affiliate of CH.A.D.D.
- I understand that filling out this survey will take approximately 20-40 minutes and that it is a one-time commitment.
- I understand that there is no direct compensation for participating in this survey.
- I understand that **no direct access** of any medical or scholastic records or any other personal document is requested; all information on the survey is merely a report of my child's status as an ADD/ADHD patient.
- I understand that this survey is completely confidential. My consent form will be separated from the survey upon arrival and the consent form will be stored in a locked file cabinet. The only identifying mark on the consent form will be the ID number located at the top of the survey.

"This research study has been reviewed and approved by the Institutional Review Board – Human Subjects in Research, Texas A & M University. For research-related problems or questions regarding subjects' rights, the Institutional Review Board may be contacted through Dr. Richard E. Miller, Office of the Vice President for Research and Associate Provost for Graduate Studies at (409) 845-1811."

I have read and understand the explanation provided to me. I have had all my questions answered to my satisfaction, and I voluntarily agree to participate in this study.

Page 1 of 2
(OVER)

Initials & Date_____

I have been given a copy of this consent form.

_____

Signature of Participant(s) and Date

_____

Signature of Principle Investigator

Michelle Delgadorodriguez (Principal Investigator)
P.O. Box. 7795
College Station, Tx. 77802
(409) 691-0330
e-Mail: mrd8490@unix.tamu.edu

Dr. Betty Milburn
Student Counseling Service
Texas A & M University
College Station, Tx. 77843-1263
(409) 845-4427 ext. 114
B-Milburn@tamu.edu

Dr Rob Heffer
Dept. of Psychology
Texas A & M University
College Station, Tx. 77843-4235
(409) 862-2228
rwh@psyc.tamu.edu

Code Number_____

Parent Form

Please fill out the following information regarding **your child.**

Part A: Background Information:

1. Age_____ 2. Gender (circle one) M F
3. Grade level in school _____
4. Age when child was diagnosed with ADD/ADHD: _____
5. Type of ADD/ADHD child was diagnosed with (circle one)

   Inattentive Hyperactive/Impulsive I don't know*

   *If you don't know which type your child was diagnosed with, please provide a short list of your child's symptoms. _____

   _____
6. Prescription drugs your child is taking for ADD/ADHD (circle one)

   Ritalin Other* None

   *If other please name_____
7. How long has your child been taking this medication? (circle one)

   0-2 months 2-6 months 6-12 months 12+ months

Part B: Details/Current Situation:

8. What factors contributed to seeking help for your child (circle all that apply):

   Behavior at school behavior at home suggestion of a teacher

   Suggestion of a physician other_____
9. On the following scale, how severe is you child's ADD/ADHD? (circle one number)

   Mild severe

   1----------2----------3----------4----------5
10. On the following scale, how helpful has prescription medication been in helping control your child's symptoms. (circle one number or N/A if not applicable).

    N/A not helpful extremely helpful

    1----------2----------3----------4----------5
11. Is your child in any special program at school designed to help with classroom performance and/or attention skills? (circle one) *Yes #No

    *Please Describe_____

    _____

    # Is such a program available at your school? (circle one) Yes No

Code Number_____

12. If you answered yes to question 11, please describe how long your child has been in this program.
    0-2 months 3-6 months 7-11 months 12+ months
13. On the following scale, how helpful do you feel this program has been?
    not helpful extremely helpful
    1----------2----------3----------4----------5
14. Is your child in any special programs at school designed to help with social skills? (circle one)
    *Yes #No
    Please Describe_____
    _____
    # Is such a program available at your school? (circle one) Yes No
15. If you answered yes to question 14, please describe how long your child has been in this program.
    0-2 months 3-6 months 7-11 months 12+ months
16. On the following scale, how helpful do you feel this program has been?
    not helpful extremely helpful
    1----------2----------3----------4----------5
17. Have your child's teachers adjusted the atmosphere of their classroom(s) or teaching methods in any of the following ways? (circle all that apply)
    no adjustment more individual attention hand signals to remind about certain behaviors
    less homework more structured assignments seating near teacher's desk
    computer assisted teaching other:_____
18. On the following scale, how much have these changes improved your child's classroom performance?
    N/A none quite a lot
    1----------2----------3----------4----------5
19. On the following scale, how much have these changes improved your child's social skills?
    N/A none quite a lot
    1----------2----------3----------4----------5
20. Which, if any, behavioral modification programs do you use at home? (circle all that apply)
    none reward system (i.e., candy, T.V. privileges) for good behavior
    punishment system for bad behavior positive reinforcement (i.e., compliments, stickers)
    other (please describe):_____
21. On the following scale, how much has this behavioral modification helped your child's symptoms?
    N/A none quite a lot
    1----------2----------3----------4----------5

Code Number _____

22. How often do you communicate with your child's teachers about his/her progress?

never rarely twice a month once a week twice a week daily ____times per semester

23. On the following scale, how would you rate the quality of communication you have w/ your child's teachers?

Poor excellent
1----------2----------3----------4----------5

24. On the following scale, how much has this communication with your child's teachers improved your child's classroom performance?

None quite a lot
1----------2----------3----------4----------5

25. On the following scale, how much has this communication with your child's teacher improved his/her social skills?

None quite a lot
1----------2----------3----------4----------5

26. How often do you communicate with your child's physician about his/her progress?

never rarely twice a month once a week twice a week daily

27. On the following scale, how would you rate the quality of the communication you have with your child's physicians?

Poor excellent
1----------2----------3----------4----------5

28. On the following scale, how much has this communication with your child's physicians improved your child's classroom performance?

None quite a lot
1----------2----------3----------4----------5

29. On the following scale, how much has this communication with your child's physician improved his/her social skills?

None quite a lot
1----------2----------3----------4----------5

30. How often does your child's teacher communicate with his/her physician?

never rarely twice a month once a week twice a week daily _____times per semester

don't know

31. On the following scale, how would you rate the quality of the communication between your child's teacher and physician?

Cannot say poor excellent
1----------2----------3----------4----------5

Code Number_____

32. On the following scale, how much has this communication between teacher & physician improved your child's classroom performance?

cannot say none quite a lot

1----------2----------3----------4----------5

33. On the following scale, how much has the communication between teacher & physician impoved your child's social skills?

cannot say none quite a lot

1----------2----------3----------4----------5

34. Please rank the following (A through E with A being the best) according to the helpfulness in improving your child's classroom performance:

_____medication _____school program _____teacher adjusted classroom

_____home behavioral modification _____other:_____

35. Please rank the following (A through E with A being the best) according to the helpfulness in improving your child's social skills:

_____medication _____school program _____teacher adjusted classroom

_____home behavioral modification _____other:_____

36. Please use this space to fill in any information you would like to clarify or any information not covered on the survey that you feel pertains to your child's ADD/ADHD.

_____

_____

_____

_____

_____

_____

37. What suggestions do you have for improving communications between parents, teachers, and physicians? _____

_____

_____

_____

_____

_____

Appendix IV

Footnotes

1. Even though this was a targeted group because of their demonstrated interest in ADD/ADHD, a low return rate was probably the result of the fact that parents of ADD children tend to exhibit ADD symptoms themselves and also the holiday season.
2. As shown in Table 1.
3. All data regarding Teacher/Physician Communication needs to be viewed with caution due to a low sample number (n=5).
4. Statistics reported in this chapter are ones that were not hypothesized, but interesting nonetheless. Before any true significance can be given to this information additional studies would need to take place.

Appendix V

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